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D. Remarks

Drawings

Unmarked versions of previously amended drawings are included herewith.

Issue 1: Whether Claims 1 and 2 are Patentable Under 35 U.S.C. §102(a) over Applicant's Background Art (*Background Art*).

All Limitations of Claim 1 are Not Shown in the Reference.

The invention of amended claim 1 is directed to a semiconductor device structure having an insulating film formed from gas containing carbon. The semiconductor device includes a contact, a gate electrode, and a silicon nitride film. The contact penetrates an interlayer insulating film and is electrically connected with a diffusion layer in a silicon substrate. The gate electrode is formed on the silicon substrate and contains a nitride film at upper and side portions.

The invention also further includes a silicon nitride film for preventing carbon diffusion. This silicon nitride film is formed on the silicon substrate while traversing a region except a portion for providing the electrical connection between the contact and the diffusion layer. Further, this silicon nitride film is formed on the nitride film at the upper and side portion of the gate electrode.

Thus, Applicant's claim 1 invention clearly recites two separate limitations:

- (1) a nitride film at upper and side portions of a gate electrode, and
- (2) a silicon nitride film formed on the nitride film at upper and side portions of the gate electrode.

As is well known, a claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single reference.

The above two, clearly separate limitations are not shown in the *Background Art*.

The *Background Art* shows a gate electrode containing a nitride film and upper and side portions.¹ There is no other nitride film. Thus, the *Background Art* does not show a "silicon nitride layer formed on the nitride film at upper and side portions" as recited in claim 1.

¹ See the Specification, FIG. 16(a), which shows a gate electrode 22 that includes silicon nitride film 20 on the top of a gate electrode 18/16, and silicon nitride film 24 on the side of the gate electrode 18/16.

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To show such a limitation, the rejection modifies single layer structures of the *Background Art*.

Films 20 and 24 each considered two separate nitride layers laminated on one another where the first layer (the lower portion of 20 and the inside portion 24) are the nitride film on the gate electrode while the second layer (upper portion of 20 and the outside portion of 24) are the silicon nitride film for preventing carbon diffusion.²

This teaching is not from the reference, and contradicts the reference. Applicant's *Background Art* makes it clear that films 20 and 24 are single layers. The attempt by the rejection, to add a layer where one clearly does not, exist is refuted by the explicit teachings of Applicant's *Background Art*.

The following citation represents explicit evidence that layers 20 and 24 are single layers, and hence in no way suggestive of a laminated layer – as argued by the rejection.

a silicon nitride film 20, and a silicon nitride film side wall 24...³

Thus, when the rejection “considers” separate layers 20 and 24 as laminated, such a consideration is a *modification* of the teachings of the *Background Art*. Further, such a modification appears assisted only with the hindsight of the teachings of the invention.

The remaining portion of the *Background Art* also weigh against the modification relied upon by the rejection. In the *Background Art*, when a layer actually is laminated, the *Background Art* clearly identifies it as so:

The word line 22 consists of a laminate film...⁴

From the above, it is clear that if films 20 and 24 were laminated, such films would be identified as such.

² Final Office Action, dated 5/23/03, Page 3, Lines 2-5.

³ Applicant's Specification, Page 2, Lines 12-13 (emphasis added).

⁴ Applicant's Specification, Page 2, Line 11.

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The Rejection Modifies the Reference – Thus Cannot be Based on 35 U.S.C. §102

In addressing Applicant's rebuttal argument, the rejection relies on the following additional reasoning:

There is no structural difference between the single layers 20 and 24 being considered two layers and two layers of the same material formed on one the other.⁵

Applicant respectfully requests a citation in support of this reasoning.

The teaching that two layers laminated on one another are the same structure as one layer is not in the *Background Art*. Applicant has thoroughly reviewed the *Background Art* and such a teaching has not been found.

As noted above, by relying on such reasoning, the rejection modifies the original *Background Art* by equating a single layer to multiple layers. Thus, the rejection cannot be based on anticipation, but instead on obviousness.

Thus, because the rejection of claim 1 relies on a multiple layer structure when the reference only teaches a single layer structure, all limitations of claim 1 are not shown.

Accordingly, this ground of rejection is traversed.

In addition, because the rejection relies on modifying single layer structures of the reference into multiple layer structures, the rejection cannot be based on anticipation – but instead obviousness. However, the necessary motivation required for an obviousness rejection is not present in the *Background Art*.

Issue 2: Whether Claims 21 to 24 are Patentable Under 35 U.S.C. §102(a) over Applicant's *Background Art* (*Background Art*).

All Limitations of Claim 21 are Not Shown in the Reference.

⁵ Final Office Action, dated 5/23/03, Page 5, Last Three Lines.

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The invention of claim 21 is directed to a semiconductor device structure that includes an insulating film formed from a gas containing carbon. The semiconductor device includes a contact, a capacitor contact that penetrates second and third interlayer insulating films, and a conductor formed on the second interlayer insulating film. The conductor contains a nitride film at upper and side portions. In addition, the semiconductor device includes a silicon nitride film for preventing carbon diffusion. The silicon nitride film is formed on the third interlayer insulating film while traversing a region except a connection portion between a lower electrode and the capacitor contact. The silicon nitride film is also formed above the nitride film at the upper portion of the conductor.

Thus, Applicant's claim 21 invention recites the following limitations:

(1) a nitride film at upper and side portions of a conductor,

(2) a silicon nitride film formed above the nitride film at upper and side portions of the conductor

The above two, clearly separate limitations are not shown in the *Background Art*.

The *Background Art* shows a bit line containing a nitride film and upper and side portions.⁶ There is no other nitride film. Thus, the *Background Art* does not show a "silicon nitride layer formed above the nitride film at upper and side portions" as recited in claim 21.

To show such a limitation, the rejection modifies single layer structures of the *Background Art*.

Films 36 and 40 are each considered two separate nitride layers laminated on one another where the first layer (the lower portion of 36 and the inside portion 40) are the nitride film on the conductor while the second layer (upper portion of 36 and the outside portion of 40) are the silicon nitride film for preventing carbon diffusion.⁷

First, as in the case of claim 1, this teaching is not from the reference, and contradicts the reference. Applicant's *Background Art* makes it clear that films 20 and 24 are single layers. The

⁶ See the Specification, FIG. 17, which shows a bit line 38 that includes silicon nitride film 36 on the top of a bit line conductors 34/33, and silicon nitride film 40 on the side of bit line conductors 34/33.

⁷ Final Office Action, dated 5/23/03, Page 3, Lines 2-5.

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attempt by the rejection, to add a layer where one clearly does not, exist is refuted by the explicit teachings of Applicant's *Background Art*, which explicitly indicates single layers:

a silicon nitride film 36, and a silicon nitride film side wall 40...⁸

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Rejection is Not Consistent With Claim Terms

The rejection applies *Background Art* structures inconsistently to Applicant's claims terms. Nevertheless, under the various possible combinations, all claim terms are not shown. The inconsistencies are emphasized below:

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[A] second interlayer insulating film 26 and a third interlayer insulating film 26...⁹

[O]n the third interlayer insulating film 32...¹⁰

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Film 26 is considered a second interlayer insulator (bottom portion) and a third insulator (top portion) of the same material formed one on top of the other.¹¹

[S]econd layer interlayer insulating film 32 and a third interlayer insulating film 42...¹²

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That is, in rejecting claims 21-24, the rejection argues that Applicant's second insulating layer is first shown by layer 26 of the *Background Art*, then shown only by a bottom portion of layer 26, then shown by layer 32.

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Similarly, the rejection argues that Applicant's third insulating layer is first shown by layer 26 of the *Background Art*, then shown by layer 32, then by only a top portion of layer 26, and then by layer 42.

⁸ Applicant's Specification, Page 3, Lines 2 (emphasis added).

⁹ Final Office Action, dated 5/23/03, Page 3, Line 14.

¹⁰ Final Office Action, dated 5/23/03, Page 3, Line 17.

¹¹ Final Office Action, dated 5/23/03, Page 3, Lines 20-22.

¹² Final Office Action, dated 5/23/03, Page 4, Lines 13-14.

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Applicant will now show that under all such various rejection arguments, the limitations of Applicant's claim 21 invention are not shown.

1. Second Insulating Layer as Layer 26 of the *Background Art*.

If layer 26 of the *Background Art* is argued to correspond to Applicant's "second insulating layer", then *Background Art* cannot show a "capacitor contact". Applicant's claim 21 recites a capacitor contact penetrating the second interlayer insulating film. As shown in FIG. 17 of the Specification, capacitor contact 46 does not penetrate layer 26.

2. Second Insulating Layer as Only Bottom Layer 26 of the *Background Art*.

Like the above case, if the bottom portion of layer 26 is argued to correspond to Applicant's "second insulating layer", then *Background Art* cannot show a "capacitor contact". As shown in FIG. 17 of the Specification, capacitor contact 46 does not penetrate layer 26.

3. Second Insulating Layer as Layer 32 and Third Insulating Layer as Layer 42 of the *Background Art*.

If layer 32 of the *Background Art* is argued to correspond to Applicant's "second insulating layer" and layer 42 is argued to correspond to Applicant's "third insulating layer", then *Background Art* cannot show a "silicon nitride film". Applicant's claim 21 recites a silicon nitride film formed on the third interlayer insulating film. As shown in FIG. 17 of the Specification, layers 36 or 40 (argued to correspond to Applicant's silicon nitride film) are not formed on layer 42.

From the above it is clear that the *Background Art* does not show all limitations of claim

21.

Applicant additionally traverses this rejection by noting that the rejection relies on teachings outside of the *Background Art*. As noted above, in one of the inconsistent analyses, the rejection relies on the following reasoning.

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Film 26 is considered a second interlayer insulator (bottom portion) and a third insulator (top portion) of the same material formed one on top of the other.¹³

This teaching is not from the reference. Nothing in Applicant's *Background Art* suggest that such a layer is or could be a laminated layer. Thus, when the rejection "considers" layer 26 as laminated, such a consideration is a *modification* of the teachings of the *Background Art*. Further, such a modification appears assisted only with the hindsight of the teachings of the invention.

For all of these reasons this ground of rejection is traversed.

Claims 1-2 and 21-24 are believed to be in allowable over the cited art. It is respectfully requested that the application be forwarded for allowance and issue.

Respectfully Submitted,

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¹³ Final Office Action, dated 5/23/03, Page 3, Lines 20-22.